better the operator, the lower the operating costs, and the higher the reservation price. Thus, this process, namely competitive bidding, drives out inefficient players, in a rational bidding environment, ab initio. It is the most efficient process from a public policy perspective having full Pareto efficiency. [14] This then leads to the issue of closed versus open bids as presented in OPTIONS 3.1 and 3.2.

OPTION 2.2

**PROVIDE FOR A LOTTERY PROCESS WHEREIN THE COMMISSION WILL ASSIGN FREQUENCIES TO "QUALIFIED" BIDDERS IN A TOTALLY RANDOM FASHION.**

The Lottery process has been experienced before in the initial stages of Cellular. It suffers from clear and well understood difficulties, such difficulties publicly acknowledged by al those involved. Lotteries have generally no entry cost. Thus the asset is not valued and the entrant is not vetted. Lotteries have the chronic problem of speculation and the resale of assets with no public benefit. Lotteries also do not recognize the efforts of those who can operate at the lowest costs, thus providing, in a truly competitive environment, the lowest price. Therefore. this option is clearly unacceptable from a public policy perspective.

OPTION 3.1

**PROVIDE THE COMPETITIVE BIDDING IN A TOTALLY OPEN FASHION, WHEREIN THE BIDDERS ARE OPENLY BIDDING FOR EACH MARKET AGAINST EACH OTHER ALLOWING THE HIGHEST PRICED BID TO WIN.**

An open bidding process tends to be the most efficient.It provides feedback to all the bidders on price and such process clearly demonstrates the true value for the property. Open bidding allows all other players in the bid to have information on all other players valuations and to adjust their values accordingly. However, it can be shown that certain forms of closed bids, such as "Second Price Auctions" with sealed bids are as efficient in clearing the market for true valuation. This OPTION is the most appropriate, however, its effect can be achieved with a modified form of closed bidding.

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14. See Shubik [1988], A Game Theoretic Approach to Political Economy, MIT Press, 1988, pp. 377-378; The author of this work refers to the large body of literature on the auctions and bidding processes. See Fudenberg and Tirole [1991], Game Theory, MIT Press, 1991, pp. 10-11, and pp.219-224; In this reference, the concept of a Second Price Auction is analytically discussed and it is shown that in such an auction, wherein the highest bidder pays the price bid by the second highest bidder, then each bidder bids their perceived value for the property. This is exactly the strategy that the Commission desires. There is a wider body of literature on auctions and bidding that clearly demonstrate the efficacy and efficiency in clearing markets and maximizing the public good.

OPTION 3.2

**PROVIDE A CLOSED BID PROCESS, WHEREIN A DATE AND TIME SPECIFIED IS CHOSEN AND ALL BIDDERS SUBMIT SEALED BIDS FOR THE FREQUENCIES SELECTED IN EACH MARKET.**

The closed bid, as was shown, can if properly constructed, result in efficient bidding. Although this is a second choice, its is recommended that this be selected since it is logistically the most efficient.

OPTION 4.1

**HOLD ALL OF THE BIDS SIMULTANEOUSLY, IN ONE OR MULTIPLE LOCATIONS, FOR EACH TERRITORY ALLOCATED A FREQUENCY.**

Holding all of the bids at the same time, forces all of the bidders to select a single bid price for a property and to value all properties based upon the reservation methodology with market information only. This can be shown to be the most efficient form of bidding process in reflecting true valuation. This OPTION is recommended.

OPTION 4.2

**HOLD ALL OF THE BIDS IN A SEQUENTIAL FASHION STARTING WITH THE LARGEST AREA FIRST OR ON A RANDOMLY SELECTED AREA BASIS.**

This bidding process adds another factor into the bid. Specifically it adds the "feeding frenzy" factor of escalating and oscillatory bids, based on fluctuating a posteriori information available to all bidders. Large oscillations in valuations can occur and these may and have been shown in other cases to result in over-valuations and the failure of properties due to over payment and failure to meet required financial returns. This process is typical in real estate bidding and it is well know to microeconomics to cause the high volatility in these markets. It is recommended that this OPTION not be followed.

OPTION 5.1

**HOLD BIDS AT ONE LOCATION BUT SIMULTANEOUSLY**

If sealed bids are used, one location is best. If open bidding is used, logistically one location could cause chaos.

OPTION 5.2

**HOLD THE BIDS AT MULTIPLE LOCATIONS BUT SIMULTANEOUSLY.**

Multiple locations for open bidding is the best logistical choice.

## 6.0 RECOMMENDATION

**IT IS RECOMMENDED THAT THE COMMISSION HAVE COMPETITIVE BIDDING, AND DOES NOT CONSIDER LOTTERIES OF ANY FORM, AND THAT THE COMPETITIVE BIDDING BE DONE IN A SIMULTANEOUS FASHION, AND IN A MANNER THAT ALLOWS MAXIMUM COMPETITIVENESS AMONGST ALL OF THE CONTENDERS. SPECIFICALLY, THE OPTIMAL CHOICE IS A FULL OPEN BIDDING PROCESS BUT BARRING THE COMPLEXITIES OF SUCH A PROCESS THE SECOND OPTIMAL RECOMMENDATION IS THE CLOSED, SEALED BIDE PROCESS, SIMULTANEOUSLY, FOR ALL AREAS SELECTED, WITH QUALIFIED BIDDERS. A QUALIFIED BIDDER SHALL BE ONE WHO HAS CLEARLY DEMONSTRATED BOTH DEVELOPMENTAL COMMITMENT THROUGH AN EXPERIMENTAL TRIAL OR TECHNOLOGY DEVELOPMENT, AS WELL AS DEMONSTRATING FINANCIAL RESOURCES ADEQUATE TO EXECUTE THE BID PAYMENT.**

## LEC OPTIONS

The LECs have significant asset base in their existing markets and are currently permitted by the Commission to enter into the entertainment distribution business. They have dominant and monopolistic control over access of all forms, have demonstrated, in many markets, a total unwillingness to unbundle, and have continued to add dramatic inefficiencies into an already overburdened rate base. Several other Observations are important:

(i) Current local telecommunications is provided via four elements; interface (the set), transport (the wires or frequency allocations), interconnect (the switch) and control.[15] These four elements are unbundalable.

(ii) The argument for the continued monopolization of the LEC continues to be based upon the observations of Alfred Kahn. [16]Kahn noted that, "the provision of local

15. See McGarty [1992,2], Alternative Network Architectures: It is demonstrated in this paper that all communications system as deconstructable into these four elements, and that the intent of the designers as to their world view is discernible through this architecture implementation. It is argued and then demonstrated in this work that the concept of a MTSO, the mobile telephone switching office is an artifact of the hierarchical view of the Bell System prior to divestiture. It is further argued that the current wireless options allow the full use of distributed computer processing power that provides for full co-location and minimal redundancy. This results in the lowest possible cost to the public.

16. See Alfred E. Kahn [1988], The Economics of Regulation, MIT Press, pp. II 127-129. Kahn has provided the classic view of telecommunications based on the technology status of 1980 and before. Although his

telephone service is a natural monopoly is generally conceded." This was based upon his four arguments:

1. **Economies of scale exist in the provision of service.** This clearly is not the case in interface, and as is demonstrated is not the case in transport. It further is clearly not the case in control, evidence the proliferation of distributed control technologies. It is also debatable that it will continue to be the case in interconnect (switching). If we assume that interconnect is the last remaining element of significant scale economies, soon disappearing because of low cost silicon and distributed processing, then it alone represents the bottleneck allowed by monopolistic theory. It then must be the only element controlled in that fashion. The commodicizable element of wireless applies equally to wire based systems.

2. **Aggregate costs are minimized in central planning.** This argument is at best specious given the technology available for electronic design, implementation, and operations. The semiconductor industry uses CAD/CAM technology which immediately avoids this bottleneck issue. Technology has gone around Kahn's argument for the second time. In contrast, however, the LEC is still operating their Central Offices the same way they did thirty years ago. A typical example is the management of the Main Distribution Frame, the MDF. The MDF is a manually interconnected set of copper wires. The computer industry would never survive competition if they used the same technology for interconnecting computer backplanes. Monopoly clears leaves technology to stagnate.

3. **Higher service standards are maintained by larger monopolistic organizations.** Clearly, organizations that depend upon quality do this by automation, not by body count. Thus this argument again fails on the issue of new technology.

4. **Universal Service can only be provided by a Monopoly.** This issue of Universal Service was and still is both a policy issue and a

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arguments can be shown to hold true at the time, technology has changed the underpinnings of this area, thus invalidating all of his arguments.

> ploy based on the original Theodore Vail anticompetitive strategy. If the government desires to provide each person with Universal Service, then that is a policy issue that transcends economics. The local rural telephone companies have always been non Bell System companies, one need look no further than New York State, wherein almost 80% of the New York Telephone Service services only 20% of the state land mass. So much for Universal Service

(iii) Unbundling of telephone company basic elements was first discussed in the ONA Dockets. These were loosely handled and led to de minimus opening of the Network. The Co-Location efforts in New York and Massachusetts by Metropolitan Fiber and Teleport clearly and unambiguously show the desire of the LECs to thwart fair and equitable access. They continue their monopolistic control. The record of this is unassailable.

It has been argued elsewhere that one can view the LEC as composed of three separate and disaggratebale elements: a retail company, a wholesale switch company and a wholesale transport company. The retail entity sells, services, supports, and bills the customer. From a rate base perspective, the retail entity has a base primarily of billing and operations support computers. It is the most people intensive entity in the LEC. The wholesale switch entity is inside plant, namely the equipment and support from the MDF, Main Distribution Frame, in through the switch to the trunk circuits. The Transport entity is the outside plant. The capital base is primarily in the outside plant. [17] The argument towards an Open Network Interconnect, ONI, therefore goes directly to the issue of disaggregating these three elements.

From the perspective of a PCS company, it is providing the Retail and Wholesale Transport functions. The PCS entity is buying Wholesale Switching from the LEC. The LEC must provide an open and equitable interconnect. Failure to do so will create a barrier to entry into this market.

Based upon these observations, and based upon the Goal established for the PCN services, the argument proceeds as follows:

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17. It can be estimate that the capital per subscriber is about $1,600 per subscriber. Of this, about $300 is in the switch, $300 in the retail entity, and $1,000 in outside plant. The Transport side then has the most staff, and the most capital. The argument then is on the basis of disaggregation, the switch marginal long run cost base should be less than $0.01 per minute per access line.

**1. GOAL**

**THE GOAL OF THE ESTABLISHMENT OF NEW PCN SERVICES IS TO PROVIDE TO THE PUBLIC, SEAMLESS AND INTEROPERABLE WIRELESS TELECOMMUNICATIONS SERVICES THAT USE THE MOST INNOVATIVE TECHNOLOGY AND TECHNIQUES AND PROVIDED IN AS COMPETITIVE ENVIRONMENT AS POSSIBLE, TO ENSURE THE MAXIMUM BENEFIT TO THE CONSUMER IN THE SHORTEST TIME.**

OPTION 2.1

**THE COMMISSION SHOULD ALLOW ENTRY OF THE LECS INTO THE BANDWIDTH FOR PCN FOR PURPOSES OF LOCAL ACCESS.**

Any bidder for spectrum, if competitive bidding is the selected choice, will value the spectrum in its most rational manner. The more bidders for the spectrum the more it benefits the public. However, bidding should be rational bidding and not cross subsidized. Namely, any bidder is assumed to treat the asset gained as if it were a stand alone economic entity with its own rate of return, and the auction price is set on this rational basis. If this can be assured of all bidders, then there is a public interest served in allowing all equally competitive players to bid, specifically a LEC, if such does not possess a strategic advantage that may disadvantage any and all,other competitors. Therefore, this OPTION is recommended subject to the market power constraints.

OPTION 2.2

**THE COMMISSION SHOULD PROHIBIT THE LECS FROM ANY ACCESS TO WIRELESS FREQUENCIES**

The LECs are in the process of unbundling their plant, allowing, in many cases, separate access to switching, transport, or control. Disallowing them the alternative of transport in a fully unbundled market would place an undue burden on them and would be both anti competitive and not in the best interest of the public. Thus, this OPTION is considered inappropriate.

OPTION 3.1

**THE COMMISSION SHOULD MANDATE FULL OPEN ACCESS TO ANY AND ALL ELEMENTS OF THE LECS SYSTEMS, ALLOW COMPETITIVE FORCES TO PLAY FULLY IN THE TRANSPORT SIDE WHILE ASSURING THE SWITCH AND LOCAL ACCESS BE PROVIDED ON A EQUAL AND EQUITABLE MARGINALLY PRICED BASIS WITH GUARANTEES AND MEASURES TO PREVENT AND PROHIBIT CROSS SUBSIDIES OF ANY KIND. SEPARATE AND EQUAL STANDARDS SHOULD APPLY.**

As was mentioned in earlier arguments, separate and distinct, arms length, unbundling, with not means or method to cross subsidize, would ensure competitive efforts to be effective in any one of the three remaining telecommunications architectural elements; switching, transport and control. Thus, if the LEC has gained an alternative and competitive position in the transport side, then the switch and control elements , if kept in a monopolistic form, should be accessible in a fashion that is equitable to all providers of transport and users of switching and control. Specifically, unbundling and the establishment of arms length separation of these functions goes to the heart of competitive access and it is both necessary and sufficient to provide ready access on an equitable and equal marginal price basis. [18]Thus, this is the recommended OPTION.

OPTION 3.3

**THE COMMISSION SHOULD ALLOW THE LECS UNENCUMBERED ACCESS TO WIRELESS FREQUENCIES, WITH NO RESTRICTIONS IN TERMS OF THEIR RESPONSIBILITIES TO OTHER CARRIERS.**

The argument, sui generis, should be rejected. By its own merits, this OPTION will create, sustain and encourage sever barriers to entry to all contenders. As has been discussed above, if the LEC is disaggregated into the three units, Retail, Transport, and Switching, then, if further the separate disaggregated units are to continue to provide services at disparate rates, then this assures a continuing bottleneck and barrier to entry.[19]

OPTION 4.1

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18. See Spulber [1989], Regulation and Markets, MIT Press, pp. 233-247. The author demonstrates the efficiency of marginal pricing in the context of optimal Pareto pricing for monopolies. The argument is still prevalent about the Kahn Long Term versus Short Term marginal pricing. It is argued in this set of Comments, that following Spulber, the Short Term marginal costs are key in view of the rapid technological change in the switch component. Dugan and Stannard [1985], Barriers to Marginal Cost Pricing, Public Utilities, pp. 43-50 demonstrate the effect that this had on access in New York in terms of the negative results of the 1975 rate Case, Case 26426 with New York Telephone. Specifically, using the long term marginal pricing set no initiative for improvement. It is further argued that this was the reasoning that led to the New York Telephone Service crisis in the same period.

19. It should be clear from several examples that such a barrier currently exists. As argued before, the LEC sells itself Switch access on the wholesale level at less than $0.01 per minute. In New York, the LEC sells the Cellular carrier access at the rate of $0.11 per minute, an eleven fold increase. In no way does N.Y. Telephone provide either transport or retails services to the Cellular carrier. In particular, in New York, as a result of a Public Service Commission order, N.Y. Telephone was mandated to establish a "brick wall" between the entities. Thus this type of pricing makes it impossible for an competitive market. Ironically, on an average basis, it can be shown that N.Y. Telephone sells retail residential service at about $0.05 per minute. With this pricing scheme, no contender can compete for any type of service.

**THE COMMISSION SHOULD REQUEST AND RECEIVE A DETAILED ACCESS PLAN FOR FULL UNBUNDLING OF THE LOCAL ACCESS PLANT PRIOR TO ANY ALLOCATION OF FREQUENCIES TO THE LECS.**

Fair and equitable access can only be assured with the existence and acceptance of a written plan. This OPTION is essential.

OPTION 4.2

**THE LECS SHOULD BE ALLOWED ACCESS WITH THE ASSURANCES THAT AT SOME TIME IN THE FUTURE THEY WILL COMPLY WITH ALL REQUIREMENTS AS MANDATED BY THE COMMISSION.**

Assurances, without a detailed, and accepted plan, leave room for manipulation, delay and obfuscation. This OPTION should be rejected.

OPTION 5.1

**THE RULES FOR THE LECS SHOULD APPLY IN KIND TO THE IECS, NO MATTER HOW LARGE OR SMALL. FULL UNBUNDLING AND FULL EQUAL AND EQUITABLE MARGINALLY PRICED UNBUNDLED SERVICE UNITS SHOULD BE AVAILABLE FOR AND FROM ANY IEC DESIRING TO OPERATE A WIRELESS SYSTEM IN THE PCN BANDS.**

The IEC have similar market power, although one layer displaced. One can envision the reconstruction of the old Bell System if AT&T were allowed free and ready access to local transport, using their market power to control Class 5 switch access, and in turn using their de facto monopoly power to control interexchance and inter LATA transport. Reconstitution of a bottleneck could occur under this scenario at the Class 4 switch, the toll/tandem network interface. AT&T, and the other IECs do not have equal access requirements, as were imposed on the LECs. It is therefor necessary that a similar unbundling be mandated on the IECs as well, in order to assure fair and equitable, full access to all elements of the network.

OPTION 5.2

**THE IECS SHOULD BE FREE FROM ANY REGULATION OR ENCUMBRANCES SINCE THEY HAVE NO ACCESS CONTROL AND SINCE EQUAL ACCESS ALREADY EXISTS.**

This OPTION should be rejected out of hand.[20]

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20. See MCI Opposition File, FCC General Docket 90-314, June 10, 1992. MCI accurately addresses the reintegration of AT&T in their discussion of the AT&T Pioneer Preference filing. MCI recognizes the fact

## 6.0 RECOMMENDATION

**IT IS RECOMMENDED THAT THE COMMISSION ALLOW THE LECS TO HAVE ACCESS TO PCN FREQUENCIES ON A BASIS THAT IS EQUAL TO ANY OTHER BIDDER, FOLLOWING THE BIDDING PROCESS THAT ALL OTHERS WILL ENTER INTO AND THAT THEY MUST, WITHIN NINETY DAYS AFTER THEIR WINNING ANY BID, SUBMIT, COMMIT, WARRANT AND GUARANTEE, TO ANY AND ALL OTHER ACCESS CONTENDERS, EQUAL AND EQUITABLE ACCESS AND PRICES TO ANY AND ALL UNBUNDLED ELEMENTS OF THE LEC NETWORK, INCLUDING BUT NOT LIMITED TO CO-LOCATION SWITCH ACCESS, CO-LOCATION FACILITIES ACCESS, ANDY ANY AND ALL OTHER UNBUNDLED ACCESS POINTS. IF ANY LEC, WINNING A BID, FAILS TO CONFORM TO THE POLICY, THEN IT LOSSES ITS BID AND FORFEITS IT BID FEE TO THE U.S. GOVERNMENT.**

## CELLULAR COMPANY OPTIONS

The existing cellular companies have an asset in terms of their free existing spectra that is immeasurable. Values per PoP of in excess of $350 are not unrealistic. For the New York market alone, of almost 20 million PoPs, this is a market value of $7 billion dollars for the existing cellular properties, with a capital plant less than $350 million. It is clear that the existing wireline and non-wireline carriers have dramatic market power in their markets. Several other observations are important:

(i) Current Cellular systems operate in a duopolistic market. In may of these markets there are dominant players who in turn create a monopolistic condition. This results in the monopolistic pricing that has been observed, namely not equaling marginal costs, resulting in significant positive cash flows. The allocation of new frequencies to the Cellular company will do nothing more than expand that monopolistic market power.[21]

(ii) Bandwidth at 800 MHz is the same as bandwidth at 1.8-2.0 GHz. In 20 MHz of bandwidth in either band, the provider may provide any set of services. In view of the Commissions desired level of service offerings, the challenge is equal with the existing Cellular companies as it is with any new contender. Further, in view of

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that AT&T, by recently announcing their renters into handsets, their re-entry into the PCN manufacturing arena, their movement at both 5 and 6 GHz and at 1.8-2.0 GHz, represents a clear and present move towards vertical integration. Clearly, AT&T can create an undue market power that would act as a chilling effect on all smaller players in PCN.

21. See Tirole [1988], Industrial Organization, MIT Press, pp. 361-385, the author demonstrates the duoplolistic balance that occurs in markets where each player has access to the others prices. Such is the case in Cellular where the prices are published as tariffs and are also made public in other ways. In the Tirole analysis, market share differences are directly related to prices differences. Having a weak competitor reverts the market to a monopoly.

the Commissions desire for competition, equal competition is capable with equal assets. Unequal asset allocation will burden, unfairly, other competitors.

(iii) Technology is generally transparent to frequency, when considering 800 MHz and 1.8 GHz. The exception to this is the learning curve cost factors on hardware, which will equalize after a reasonable time in market.

(iv) The basic service elements in both the 800 MHz band and the 1.8 GHz band are commodicizable. That is, toll grade quality voice in a fully wireless format for any user, is the capabilities of either bands. The existing Cellular companies have been demonstrating microcell technology, portable technology, and PCN market like technology, all bundled in their existing bands. Several of the Cellular Presidents have on multiple and repeated occasions stated that there was no further need for bandwidth. Technically this Commentor agrees, other than the need to eliminate a monopoly that is counter the public interest.

Based upon these observations, and based upon the Goal established for the PCN services, the argument proceeds as follows:

1. GOAL

**THE GOAL OF THE ESTABLISHMENT OF NEW PCN SERVICES IS TO PROVIDE TO THE PUBLIC, SEAMLESS AND INTEROPERABLE WIRELESS TELECOMMUNICATIONS SERVICES THAT USE THE MOST INNOVATIVE TECHNOLOGY AND TECHNIQUES AND PROVIDED IN AS COMPETITIVE ENVIRONMENT AS POSSIBLE, TO ENSURE THE MAXIMUM BENEFIT TO THE CONSUMER IN THE SHORTEST TIME.**

Clearly, the issue of establishing a competitive marketplace goes to the heart of this argument.

OPTION 21.

**THE CELLULAR COMPANIES SHOULD BE DENIED ACCESS TO PCN FREQUENCIES.**

A total denial of access is clearly unfair and denies competition in markets wherein the cellular companies do not currently operate. This is not an acceptable OPTION.

OPTION 2.2

**THE CELLULAR COMPANIES SHOULD BE ALLOWED ACCESS TO THE PCN FREQUENCIES.**

Access, albeit limited by certain guarantees of competitiveness are appropriate. This leaves two possible alternatives as presented in OPTIONS 3.1 and 3.2.

OPTION 3.1

**THE CELLULAR ACCESS SHOULD HAVE NO RESTRICTION.**

No restrictions allows a cellular company to have twice the frequency space as any other competition. Further, unlimited access would, in the case of a fixed number of licenses, preclude another more efficient competitors. Therefore this option is unacceptable.

OPTION 3.2

**THE CELLULAR ACCESS TO BE RESTRICTED TO AREAS NOT PRESENTLY COVERED.**

Allowing cellular companies to bid in areas in which they have no current interests allows for the existence of maximum competition. This leaves as the only conclusion;

**4.0 RECOMMENDATION**

**IT IS RECOMMENDED THAT ANY CURRENT CELLULAR COMPANY, ITS PARENT, MAJORITY SHAREHOLDER, OR OPERATOR BE DENIED ADDITIONAL FREQUENCY SPACE IN THE NEW BAND, IN MARKETS IN WHICH THEY CURRENTLY SERVE, AS BEING DEMONSTRABLY ANTI-COMPETITIVE.**

REGULATION OPTIONS

There are several possible options that the Commission has suggested for the proper delivery of PCN services. The two extremes suggested are that of a Common Carrier and that of a Private Network Provider. Several Observations are first apparent:

(i) The service provided under the new PCN concept should have a basic commidicizable element, namely totally wireless toll grade quality service, allowing full interconnectivity and interoperability. The Commissions desires to also provide as many new services as possible should be enabled by the new access scheme, not solely provided by it. As an enabler, therefore, the system must be open to all users.

(ii) Private networks are directed to satisfying the needs of a select group of users whose economic value to the new service may be much higher than those of the public, and thus are willing to pay more for the service. Allowing the service to satisfy closed user groups is a direct disincentive to lower costs and thus maximize the public good.

(iii) Private networks, assuming an underlying highly cost competitive commodicizable core, can be built upon the core, using efficient marginal pricing of the services and thus allowing market segments benefits from this new band. It will further add to the overall competitiveness of the market.

Based upon these observations, and based upon the Goal established for the PCN services, the argument proceeds as follows:

**1. GOAL**

**THE GOAL OF THE ESTABLISHMENT OF NEW PCN SERVICES IS TO PROVIDE TO THE PUBLIC, SEAMLESS AND INTEROPERABLE WIRELESS TELECOMMUNICATIONS SERVICES THAT USE THE MOST INNOVATIVE TECHNOLOGY AND TECHNIQUES AND PROVIDED IN AS COMPETITIVE ENVIRONMENT AS POSSIBLE, TO ENSURE THE MAXIMUM BENEFIT TO THE CONSUMER IN THE SHORTEST TIME.**

The Goals has emphasized the needs for "seamless and interoperable services" and "competitive environments". To achieve this it is essential that access be made available to al users as well as all service providers. Access must be made in an open architecture format and all potential providers of the serves, other than just the PCN Licensees must have fair and equitable access to the service. To ensure Competition, therefore, it is also necessary that all provider have a cross access capability, thus ensuring both competitiveness as well as interoperability. The two extreme alternatives are described as follows:

OPTION 2.1

**THE SERVICE SHOULD BE PROVIDED IN A COMMON CARRIER BASIS, WITH OPEN INTERFACES AND ACCESS FEES PROVIDED ON A EQUAL BASIS TO ALL POTENTIAL USERS OF THE SERVICE.**

Common carrier concepts contain several key elements that go to the heart of providing an effective service that meets the public good. First, a common carrier, as understood within the body of common carrier law, provide a common underlying capability that is made accessible to a

wide segment of the market, and in fact must be accessible to any set of users. As a common carrier, the common underlying capability must be available in some form of open interface, be it a road, a truck, a gas line or a telecommunications system. Further, it must be open to any reasonable user, who may claim access rights to it. Common carriage serves two purposes; first it encourages the flow of commerce, whether that flow is in good or services, and second, it ensures the right of users to have fair and equitable access to the service on a commonly accepted cost base. Common Carrier status demands of the provider that they provide access on a fair and equitable basis to all seekers of the service. This view of Common Carriage is more consistent with current policy views than that of the earlier regulatory control elements developed in the context of monopolists. As such, common carriage in this context, extends and enhances the well accepted status applied under common law. It clearly is an interest imbedded in the development of maximum public good.

OPTION 2.2

**THE SERVICE SHOULD BE PROVIDED AS A PRIVATE NETWORK SERVICE, USING PROPRIETARY INTERFACES, AND PRICING THE SERVICE SEPARATELY AND DIFFERENTLY FOR EACH DIFFERENT USER SEGMENT.**

A Private Network approach allows for the segmentation of the service, differential pricing and in certain instances denial of access. A Private Network status may be appropriate in a reseller market wherein the commodicizable nature of the service in enhanced with additional elements and then sold. As a primary means of selling the commodicizable underlying service, Private Network options delimit access, and disallow optimizing public good. Therefore the recommendation is to reject this option.

OPTION 3.1

**THE SERVICE AND THE SYSTEM SHOULD PROVIDE OPEN ACCESS TO ALL USERS THROUGH A COMMON AND PARTIONABLE SET OF SERVICE OFFERINGS, WITH A PUBLICLY AVAILABLE SET OF PRICES FOR THE SEGMENTED OFFERING SET.**

Common Carriage allows open interfaces and commodicizable elements. Open access through a common set of defined and published interfaces is the only way to ensure the delivery of a publicly available service. In addition, the Commissions desire to provide a service rich environment can best be achieved by means of allowing ready access to the basic service elements to all third party service providers.

OPTION 3.2

**THE SERVICE SHOULD BE PROVIDED ON THE BASIS OF SEPARATELY NEGOTIATED INTERFACES AND BUNDLING OF OFFERINGS WITH MARKET SEGMENTED PRICING.**

Separately negotiated interfaces will not allow the access to the service in an open fashion and thus will tend to discriminate against certain sets of the market. As such this option should be rejected.

OPTION 4.1

**THE SYSTEM SHOULD PROVIDE AN OPEN INTERFACE THAT IS DEFINED IN TERMS OF PUBLICLY ACCESSIBLE STANDARDS, AND CAN BE INTERFACED BY ANY ENTRANT INTO THE MARKET FOR THE PROVISION OF SERVICES OR THE NEED OF ACCESS.**

Open interfaces are synonymous with Standards. Therefore this OPTION is necessary.

OPTION 4.2

**THE SYSTEM SHOULD HAVE A PROPRIETARY INTERFACE THAT CAN BE ACCESSED ONLY WITH THE SPECIFIC AGREEMENT OF THE LICENSE HOLDER AND THAT ALLOWS SEGMENTED USER GROUPS.**

Proprietary interfaces are, as with OPTION 3.2, unacceptable because of their potential for market discrimination. This OPTION should be rejected.

**5.0 RECOMMENDATION:**

**IT IS RECOMMENDED THAT THE SERVICE BE REGULATED AS A COMMON CARRIER, ALLOWING FULL AND OPEN ACCESS WITH DETERMINED, DEFINED AND PUBLISHED TARIFFS, TO ALLOW MAXIMUM UTILIZATION OF TE NEW ACCESS TECHNOLOGY.**

## TECHNICAL AND OPERATIONAL ISSUES

Technical aspects of the development of a PCN service relate to two major issues; interoperability and seamless service, and the selection of the best available technology. A third issue arises from this which, although separate from the first two recognized by the Commission, is no less important. The third issue is that of U.S. competitiveness. The Commission sought comments on the

need for Standards in this new field. Several Observations are appropriate before developing the issue of Technical and Operational Considerations:

(i) Communications has over the past decade demonstrated an great ability to deal with different protocols or standards through the use of distribute technologies, software definable interfaces, and through the acceptance of gateways, bridges and routers. The proliferation of local area networks alone demonstrates that many computer users have had no problems connecting millions of computers together using technical ingenuity.

(ii) Standards processes generally benefit the existing large corporation that has the financial resources to delay progress and protect their imbedded base of technical compentencies. The history of the AT&T vertical integration efforts for its first one hundred years is now a clearly demonstrated example of how market control and regulated standards stifled any progress in telecommunications, leaving the telecommunications system in the United States almost unchanged in a twenty five year period.

(iii) Creativity has been a result of unfettered open market competitive delivery of systems that are tested by whether the consumer buys it or not. PCN is a prime example of the consumer being the ultimate arbitrator of the market. The United States lead in certain technologies, such as distributed computer processing, has been a result of non-standards, other than those resulting from coalition based standards such as UNIX, X.11, and TCP/IP. They were chosen because they worked and not because a Standards body said they would work. One need look no further than the DoDs multiple attempts to Standardize software. First it was Jovial, then ADA and finally, they are accepting C++ because it works. Standards work ex post facto, not ab initio.

(iv) Advisory Committees work only in the context of protecting embedded interests. In a true market environment, with a basically commodicizable service, such as PCN, the consumer will be the selector of the best technology. The consumer selection process will be based on quality of the service and its cost. Free market forces will compel the providers of the service to create coalitions to obtain larger and most likely national market elements, compete on the lowest possible cost, while ensuring the best quality of service. Cellular, as a duopoly, and effectively due to the weak player syndrome, a de facto monopoly, made monopolist's profits, while delivering a service that was touted as "snap, crackle and drop" with not

significant improvements in most markets. The Cellular companies have been to wireless what the CATV companies have been to entertainment distribution; monopolistic market control with noncompetitive quality standards.

Based upon these observations, and based upon the Goal established for the PCN services, the argument proceeds as follows:

1. GOAL

**THE GOAL OF THE ESTABLISHMENT OF NEW PCN SERVICES IS TO PROVIDE TO THE PUBLIC, SEAMLESS AND INTEROPERABLE WIRELESS TELECOMMUNICATIONS SERVICES THAT USE THE MOST INNOVATIVE TECHNOLOGY AND TECHNIQUES AND PROVIDED IN AS COMPETITIVE ENVIRONMENT AS POSSIBLE, TO ENSURE THE MAXIMUM BENEFIT TO THE CONSUMER IN THE SHORTEST TIME.**

OPTION 2.1

**ALLOW THE DEVELOPMENT AND DEPLOYMENT OF PCN LICENSES IN THE MOST COMPETITIVE ENVIRONMENT, ALLOWING MARKET FORCES, SUBJECT TO A MINIMUM LEVEL OF SERVICE STANDARDS, TO CONTROL THE CONSUMER INTERFACE.**

The existing process for the development of wireless service, through such venues as Pioneer's Preference, has developed a coalescing set of groups that have begun to merge around common technologies, that are in effect becoming de facto standards. If the Commission, in its wisdom, allows this natural market force to continue and reach fulfillment, then maximum competition will result and access to the public will be optimized.

OPTION 2.2

**ESTABLISH A STANDARDS PROCESS AND A STANDARDS BODY TO REACH AGREEMENT ON ANY AND ALL STANDARDS PRIOR TO ALLOWING ANY ENTITY TO BEGIN CONSTRUCTION AND HOLD EACH ENTITY, NAMELY LICENSE HOLDER, TO STRICT COMPLIANCE WITH THE STANDARDS.**

This OPTION has the merits of reaching a concensus agreement but fails on two fronts. First, standards efforts at this stage would introduce significant delays in the process and would, based upon independent estimates, introduce a three to four year delay. This is counter the Commission objectives. Second, a standards effort at this stage may introduce the burdensome results found in GSM in Europe of having a heavy standard that increases costs and thus prices. This clearly delimits true competitiveness and is not in the public interest. This OPTION should be rejected.

OPTION 3.1

**ALLOW FULL AND FREE MARKET FORCES TO CREATE COALITIONS AND ALIGNMENTS SO AS TO CREATE AND MAINTAIN DE FACTO STANDARDS AND DE FACTO NETWORKS ON A NATIONAL SCALE.**

There exist adequate options from the Pioneer's Preference process that allow several viable choices. From prior arguments, there is also the current development underway on national coalitions focused around existing technologies. Thus the Commissions goals can be attained in this approach. This OPTION is recommended.

OPTION 3.2

**ESTABLISH A PCN ADVISORY COMMITTEES, SUCH AS THE ONE FOR HDTV, TO CONSIDER DIFFERENT PROPOSALS FOR PCN IMPLEMENTATION AND REPORT BACK TO THE COMMISSION ACCORDINGLY.**

A single universal standard is not necessary. Interoperability amongst systems is achievable a,d multiple overlay networks acting in a fully competitive fashion maximize the public benefit. Technology will change in the classic seven year cycle and convergence is attainable in the long run. HDTV addressed another drastically different issue. There would be only one frequency band assigned and used by all. Here there will be several bands used by many. This OPTION is not necessary.

OPTION 4.1

**ESTABLISH A POLICY DIRECTIVE THAT ENCOURAGES, ALLOWS, AND FUNDS, FOR A BRIEF PERIOD, AN EXISTING NATIONAL FEDERAL CONTRACT RESEARCH CENTER, TO ACT AS THE NEW INDUSTRY'S R&D FACILITY, ALLOWING A COMMON GROUND TO MEET AND DETERMINE THE BEST COMMON SETS OF INTERFACES AND TO DEVELOP CAPABILITIES TO INTERCONNECT WHEN DIFFERENT STANDARDS ARE USED.**

There are significant resources in the Government sector that have developed technologies and techniques that are applicable to the support and nurturing of PCN. Specifically, the FCRC (Federal Contract research Centers) have over the past fifty years taken leading roles in the development of such technologies. They have missions that are now in flux and present to the Country an unique opportunity to transfer that expertise from the Defense sector to the public sector. It will provide a unique chance to capture the critical technical competence that will ensure U.S. leadership

in this new technology. In fact, many of the founders of the CDMA technology, as well as TDMA, obtained their early training in such institutions. Prime among them is the Massachusetts Institute of Technology's Lincoln Laboratory, an FCRC of the U.S. Air Force. This entity has demonstrated through its working technology the key elements of TDMA, CDMA, FDMA, speech processing and compression, voice and dat communications, solid state devices, and network management and control. It is a leader in wireless communications

The Government has a unique opportunity to build on this excellence, by using a portion of the funds obtained through the competitive bid process to establish a center of excellence at MIT Lincoln Laboratory, and then to have it funded from the carriers as they become profitable.

OPTION 4.2

**ALLOW THE INDUSTRY TO DEVELOP ON ITS OWN, AND THROUGH INDEPENDENT AUSPICES, BODIES AND ENTITIES TO GENERATE AND SUPPORT TECHNICAL INTERFACES AND STANDARDS.**

Generally an independent body can be developed but it will take considerable time and effort. Suffice it to look at Cable Labs, an entity that took twenty five years or more to evolve, or look at the Cellular groups, who have nothing more than three staff in Washington with some technical expertise, thus resulting in the CDMA/TDMA confusion. A clear opportunity presents itself at this confluence of events.

## 5.0 RECOMMENDATION

**IT IS RECOMMENDED THAT THE COMMISSION ALLOW TECHNOLOGY TO BE USED TO RESPOND TO THE OVERWHELMING MARKET FORCES, DRIVEN BY QUALITY AND COST, TO CREATE AND SUSTAIN, DE FACTO COALITIONS TO ASSURE COMMONALITY OF SERVICE AND THE ESTABLISHMENT AND SUSTAINMENT OF A SEAMLESS AND INTEROPERABLE NATIONAL NETWORK. THAT THE COMMISSION MOVE WILL ALL SPEED IN LICENSING THE NEW BANDS, AND PRESS ALL SUCCESSFUL LICENSE HOLDERS INTO RAPID DEPLOYMENT OF THEIR SERVICE. THAT THE COMMISSION, WITH THE CONSENT OF THE CONGRESS, SUGGEST, RECOMMEND, AND IF NECESSARY SUPPORT THROUGH APPROPRIATE APPROPRIATIONS, THE ESTABLISHMENT OF A NATIONWIDE PCN LABORATORY, TO ACT AS THE INDUSTRY FOCUS FOR THE NEW INDUSTRY, INITIALLY SUPPORTED BY THE GOVERNMENT AND SUBSEQUENTLY TOTALLY SUPPORTED BY THE INDUSTRY. IT IS FURTHER RECOMMENDED THAT AN FCRC, SUCH AS MIT LINCOLN LABORATORY, BE NAMED THAT CENTER OF EXCELLENCE, FURTHER ALLOWING THE TRANSFER OF DEFENSE BASED TECHNOLOGY INTO THE PUBLIC SECTOR, THUS FURTHER MAXIMIZING THE PUBLIC BENEFIT.**

STRATEGIC ALTERNATIVES

The Commentor had developed a different approach to the development of PCN services that differs from that of many of the other Commentors. The Commentor has taken the approach that it is necessary and appropriate to develop the technology in an open and shared environment and not to have it contained solely in a closed and proprietary interface.

The Commentor's approach has been built upon a seven point strategy which meets and exceeds the desires and goals of the Commission. The approach of the Commentor also expands beyond just the PCN service allocation and provides a national strategy for success in wireless. This seven point strategy is as follows:

(i) Innovation: The Commentor has approached the new service offering with new and innovative methods, systems, technologies, and strategies. The combination of all of these elements creates a broad base of innovation. Innovation in the view of this Commentor includes not only the development of new technology, as the Commentor has clearly demonstrated it has done, but a new world view towards this new opportunity. The Commentor has argued this paradigm shift before the Commission on multiple occasions and has demonstrated that the current policy positions towards broad based innovation are in the best national interests.

(ii) Involvement: The Commentor has been open in its involvement with and by other parties in its approach to innovation. Involvement and openness are key to the ability of achieving the goal of maximizing the public good with a quality seamless national capability.

(iii) Leverage: Involvement has been taken to the point of leverage. Leverage has been focused on ensuring that the entire "food chain" of capabilities is in place. The Commentor has also opened discussions with other Commentors in amending their licenses to demonstrate a national networking capability using the CDMA technology base.

(iv) Holistic View: The Commentor is unique in its approach of looking at the system in a holistic fashion. The public good is served in best fashion if and only if the user is considered ab initio and integrated into the system construct and architecture.
(v) Diffusion of Results: The Commentor has taken the approach of sharing its results and approaches openly with all other interested parties. It has further taken the approach of sharing operations and as such has

opened discussions with other Commentors to demonstrate interoperability and seamlessness.

(vi) Open Architecture, Design and Interfaces: The approach of all technical elements in the Commentor's design demonstrate open architectures. Thus the approach is migratable across barriers ensuring the ability to provide seamless service.

(vii) National Seamless Networking: The Commentor believes, and demonstrates in this COMMENTS, that a national service is achievable without a national license. Furthermore the Commentor has taken steps to amend its Experimental License to include intersystem operability demonstrations. The Commentor further argues that the IECs can and have demonstrated interest in supporting all backbone interconnections to allow full national networking.

The Commentor argues that its approach, using this seven point strategy, is unique, has been demonstrated to have already achieved some successes, and will provide a basis for achieving the goals and objectives set forth by the Commission.

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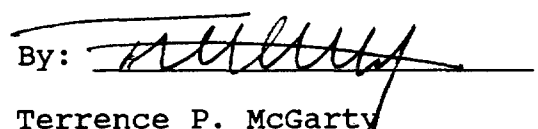
COPY November 9, 1992

REQUEST OF COMMENTOR

WHEREFORE, the Commentor hereby respectfully requests that this filing, being a Response to the Commissions Docket 92-333, be considered as part of the overall deliberations entered into by the Commission regarding the issuance of license for the purpose of providing PCN services. Moreover, the Commentor, requests that the Commission recognize and incorporate a process of analysis, that leads unambiguously and consistently to a set of conclusions to the questions posed by the Commission in its NPRM. The Commentor, hereby requests that the positions that it has taken, resulting form a direct and exact application of this process, be considered for incorporation into the Final Proceedings of the Commission in this matter.

Respectfully submitted,

TELMARC TELECOMMUNICATIONS
OCTOBER 30, 1992

By: 

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President and Principal
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Dated: October 30, 1992

COPY November 9, 1992

CERTIFICATE OF SERVICE

I, Anastasia Vournas, hereby certify that a copy of the foregoing pleading has been sent by hand delivery (*) or by United Sates mail, first class and postage prepaid, to the following on this 30th day of October, 1992:

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The Honorable Sherrie P. Marshall*
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The Honorable Ervin S Duggan *
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Attested to this day, October 30, 1992,

Anastasia P. Vournas

Anastasia Vournas,
Executive Vice President
and
Secretary,
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